

REMARKS

As reflected in the above amendments, applicant intends to cancel claims 75 and 99 and incorporate their limitations into independent claims 53 and 77 respectively. However, for clarity in these remarks, applicant will first address the examiner's rejections of claims 75 and 99, as previously presented, under 35 U.S.C. 112, first and second paragraphs.

The examiner has rejected claims 75, 76, 99, and 100 under 35 U.S.C. 112, first paragraph as failing to comply with the written description requirement.

Regarding claims 75 and 99, the examiner asserts that the specification does not appear to contain any references to instruction sets in general or a second instruction set being a sub-set of the third instruction set in particular. In both claims 75 and 99 the term "third instruction set" is used in error and is intended to read "first instruction set." See proposed amendments to claims 53 and 77 above and discussion of 35 U.S.C. 112, 2nd paragraph rejections below. For the purposes of addressing the rejection under 35 U.S.C. 112, 1st paragraph, applicant assumes the claim correctly reads, "the second instruction set is a sub-set of the first instruction set."

The specification states: "[the] rule program 66 comprises a set of operations, selected from operations supported by the respective components of the network connection device 12" (page 19, lines 19-21, emphasis added). The specification also states: "the rule program 66 is executed by the virtual machine 10" (page 33, line 15). Applicant submits that the operations supported by the respective components of the network connection device are appropriately described as the network connection device's "instruction set." Applicant further submits that a person skilled in the art to which the present invention, as defined by claim 75, pertains, would recognize that the "operations supported by the respective components of the network connection device" (as recited at page 19, lines 19-21) constitute an instruction set of the network connection device, and that the "set of operations" selected therefrom is part of the instruction set and may thus properly be referred to as an instruction set. There is nothing objectionable in referring to the overall instruction set as a first instruction set and the selected set of operations as a second instruction set. Applicant therefore submits that claims 75 and 99,

amended to correct the inadvertent errors discussed below, would comply with the written description requirement of 35 U.S.C. 112, first paragraph.

However, if the examiner disagrees, applicant would be willing to amend the claims to use the term "set of operations" in place of "instruction set" where appropriate.

Regarding claims 76 and 100, in light of the arguments regarding previously presented claims 75 and 99 above, applicant submits that claims 76 and 99 also comply with the written description requirement of 35 U.S.C. 112, first paragraph.

The examiner has rejected claims 55, 75, 76, 99, and 100 under 35 U.S.C. 112, second paragraph as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 55 and 79, the examiner has asserted that the limitation "the second section being non-exclusive of the first section" is unclear. Applicant included the limitation at issue to avoid the inference that the first and second sections are exclusive of one another and to show that the second section may contain all, some or none of the elements of the first section, e.g. if the first data packet contains elements A, B, C, and D and the first section is made up of elements A and B, applicant does not intend the second section to be limited to elements C and/or D. Applicant gratefully acknowledges the examiner allowing amendment to the claims to clarify applicant's meaning. Respectfully, applicant proposes amending claims 55 and 79 to replace the assertedly unclear wording with "wherein the second section may include at least part of the first section." Applicant submits that proposed amendment to claims 55 and 79 comply with the requirements of 35 U.S.C. 112, 2nd paragraph.

Regarding claims 75 and 99, as previously presented, the examiner has asserted that the limitation of "the third instruction set" has insufficient antecedent basis. Applicant gratefully acknowledges that the examiner has pointed out an inadvertent error in the claims, in which applicant intended to recite "the *first* instruction set." Applicant proposes amending the subject matter of claims 75 and 99 to replace "the second instruction set is a sub-set of the third instruction set" with "the second instruction set is a sub-set of the first instruction set" and requests that the examiner allow the

proposed amendments to correct the inadvertent errors. Applicant submits that proposed amendment to claims 75 and 99 would have brought claims 75 and 99 into compliance with the requirements of 35 U.S.C. 112, 2nd paragraph and would have only required cursory review by the examiner.

Regarding claims 76 and 100, in light of the arguments regarding claims 75 and 99 above, applicant submits that claims 76 and 100, as previously presented, also comply with the written description requirement of 35 U.S.C. 112, second paragraph.

The examiner has rejected claims 53-56, 72-74, 77-80, and 96-98 under 35 U.S.C. 102(e) as being anticipated by Hawkinson.

Without acquiescing in the examiner's rejection of claim 53 as previously presented, applicant proposes amending claim 53 to incorporate the limitations of claim 75, including the proposed amendments discussed above. Applicant submits that the proposed amendments to claim 53 do nothing more than narrow claim 53 to the scope of previously presented claim 75 and therefore should be allowed by the examiner under 37 CFR 1.116.

The present invention, as defined by claim 53, relates to a method of managing network traffic (designated 16 in the embodiment shown in FIG. 1) being routed through a network connection device (designated 12). The network connection device includes a first instruction set. The network traffic (16) is composed of at least first and second traffic flows and each traffic flow is composed of at least one data packet (in the embodiment shown in FIG. 1, the first traffic flow is composed of packets A and the second traffic flow is composed of packets B). The method includes instantiating a virtual machine (10) on the network connection device (12) for managing the subsequent steps of the method using a second instruction set, which is a sub-set of the first instruction set (see above). The method also includes receiving and storing at least a first criterion (18) at the network connection device (12), receiving and storing at least a second criterion (18) at the network connection device, and receiving and storing first and second instructions (POLICY 1 and POLICY 2 respectively, FIG. 4) at the network connection device. The network connection device (12) uses the first criterion (18) to identify the traffic flow to which a data packet belongs. The network connection device (12) uses the second criterion (18) to classify a traffic flow

as belonging to one of at least first and second traffic flow classes. The first and second instructions are used for processing a data packet and are associated with the first and second flow classes respectively. The method also comprises receiving a first data packet (29) that belongs to the first traffic flow at the network connection device, determining that the first data packet belongs to the first traffic flow, determining the traffic flow class to which the first traffic flow belongs, and processing the data packet according to the instructions associated with the flow class to which the first traffic flow belongs.

Hawkinson describes a method for classifying information received by a communications system. Hawkinson's FIG. 2 illustrates a queuing module 200 implemented on a communications device 100 (FIG. 1). Network traffic elements, including ATM cells, are received by a receive module. Certain types of ATM cells, relating to flow control, are passed to a resource manager block 222. The resource manager 222 responds to these cells by issuing requests for establishing, terminating, and modifying connections to a connection management task 226. The connection management task 226 then directs the resource manager 222 to install, de-install, or modify the connections (Hawkinson, Col. 6, lines 41 - 46). The resource manager 222 also maps class and policy definitions, such as resource requirements, for the flows. A flow database 224 containing the current resource state and other parameters and state variables is coupled to the resource manager 222 (Hawkinson, Col. 7, lines 4-10).

The receive module includes a flow classification and routing block 218 (FIG. 4). The flow classification and routing block 218 examines incoming data units and determines if the data units belong to an existing flow. If so, the flow classification and routing block then establishes the class of network traffic the existing flow belongs to using a class definition table 332 (see Table 1), a policy definition table 334 (see Table 2) and a pipe definition table 336 (see Table 3). These tables instruct the flow classification and routing block 218 how to proceed in handling the data unit. If a new flow needs to be established, the flow classification and routing block will pass a resource request to a fly-by flow admission block 232. The fly-by flow admission block in turn determines the quality of service (QoS) the new flow will require and makes a request to the

resource manager 222. The resource manager 222 then determines if there are enough resources available to meet the requested QoS. If the necessary resources are available, the resource manager 222 notifies the fly-by flow admission block 232, which in turn acquires the new flow.

The present invention, as defined by amended claim 53, is distinct from the method described in Hawkinson. The method of claim 53 instantiates a virtual machine to manage network traffic being received by the network connection device. A virtual machine is a software emulation of one hardware device on another hardware device. The operations a virtual machine is capable of performing are limited by i) the operations the hosting hardware device is capable of performing and ii) the degree to which the virtual machine's creator wishes to give the virtual machine access to the operations of the hosting hardware device. There is no technical reason why a virtual machine could not be instantiated on a network connection device such that the virtual machine has access to all of the network connection device's available instructions (i.e. the first instruction set). In accordance with the present invention however, the virtual machine is limited to performing actions using only operations contained within the second instruction set. Limiting the access to a sub-set of the available instructions (i.e. the second instruction set) is an intentional and significant limitation on the present invention, as defined by claim 53. Hawkinson does not disclose or suggest that the queuing module 200 is a virtual machine within the meaning of claim 53. Further, there is no disclosure, either explicitly or implicitly, that the queuing module 200 is subject to any limitation with regard to available operations of the communication device 100.

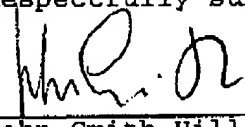
The limited instruction set available to the virtual machine is an important security feature of the present invention, as defined by claim 53. As an example, consider two network users who are exchanging confidential communications over a network. Using the method described by Hawkinson, there is nothing to prevent a third party from accessing the queuing module 200 and modifying the policy definition table 334 associated with the PDUs of the confidential communications. This could allow the third party to intercept the confidential communications. In contrast, using the present invention, as defined by claim 53, the operations of the network connection device (12)

that would permit the communications to be re-routed can be excluded from the 2nd instruction set thereby making the confidential communications more secure.

In view of the above arguments, applicant submits claim 53 is patentable. It follows that dependent claims 54-74 and 76 are also patentable.

Applicant further submits that the above arguments relating to claim 53 apply equally to claim 77, which has been amended to incorporate the limitations of claim 99 similarly to amended claim 53 and applicant submits that claim 77 is therefore patentable. It follows that claims 78-98 and 100 are also patentable.

Respectfully submitted,

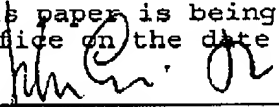
  
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